

OUR BOOK SHELF

Famines in India; their Causes and possible Prevention.
Being the Cambridge Le Bas Prize Essay, 1875. By
A. Lukyn Williams, B.A. (London: Henry S. King
and Co., 1876.)

WE have in this prize essay a very creditable digest of a mass of blue books touching on a subject of the greatest importance to India, and to ourselves. Mr. Williams has first sought to interest his readers by recalling famines nearer home and their dreadful consequences; he has then divided his subject into two parts, the first occupied with the causes, the second with the possible prevention of famines in India.

The chief causes producing a failure of crops are to be found in the land having too little or too much water,—in the failure of the seasonal rains, or in floods from overcharged rivers; to which must be added the wants due to the difficulty of conveying food from places where it is abundant to those where its production has been destroyed. There can be little doubt as to the common causes of famines in India; the important question is how they are to be prevented.

Is it possible to be prepared for a failure of the seasonal rains, that is, can we foresee by our present knowledge, that a year, half a year, or even three months hence there will certainly be a great deficiency of rain over a given district or country? This, we have to confess, is at present beyond our power. Meteorology cannot yet be called a science; it is a series of fragmentary facts; a mass of undigested observations; a groping after laws through false hypotheses which have gained their position through celebrated names. As long as men like Galileo were satisfied with the hypothesis that nature abhorred a vacuum, all progress in hydrostatics was impossible. Although we have got over that, the spirit which kept Aristotle alive is still above ground, and meteorology will scarcely advance unless facts are studied independently of the views of any master as to their causes. What hereafter may be possible in the way of prediction is too wide a subject for this notice.

Failing the foreknowledge required to be prepared for the want of rain, there remains the very practical process of being provided with water, through canals and aqueducts connected with the many perennial sources of India. Mr. Williams appears to have referred little to the views of Sir Arthur Cotton on this part of the subject, though these are of the highest value. When both rain and aqueducts are wanting, good means of communication with more favoured districts are essential (these are indeed essential in any case), great central railways are required for our hold, and proper government of the empire, but these are too costly to satisfy for many long years the real requirements of such a people and of such a country. Wherever they can be made, canals, which serve as great lines of communication and feeders of aqueducts for irrigation, are apparently best suited to the present wants of India: these, with large reservoirs, which could frequently be constructed at moderate expense, would diminish to a great extent the possibility of famine.

That forests retard the discharge into rivers of the fallen rain, and diminish the height of floods, is a fact now so well known that the planting of trees and the preservations of woods, especially on steep slopes, has been recognised as essential to the protection of every land subject to inundations. Mr. Williams has treated of these and many other matters, including the improvement of agriculture and land tenure, in a way which shows he has mastered the reports of several highly distinguished officers who have studied these questions on the spot; and the essay will give readers interested in its subject a very satisfactory idea of the facts connected with it.

LETTERS TO THE EDITOR

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Lectures on Meteorology

MOST people conversant with the subject will agree with "Spes" (vol. xiii., p. 169) that meteorology should now be considered as much a separate science as mineralogy or geology, and be taught as such; but I would suggest whether without waiting for the foundation of special chairs in the colleges, immediate steps might not be taken with advantage to bring it before the class of persons not usually to be found in colleges, to whom it is of essential importance, by means of the Science and Art Department Organisation.

Physical Geography, which may be considered as a somewhat kindred science, is, I believe, one of the most popular amongst the candidates for the South Kensington certificates, and by the directory for 1875 it appears that in that year this subject was taught in 686 classes to 17,720 students, thus heading the list of science schools, for the next two subjects in popularity; Elementary Mathematics and Electricity, only number 537 and 485 classes, with 10,502 and 12,515 students respectively.

Dr. Hooker, P.R.S., the learned director of the Royal Gardens, Kew, in arranging the science lessons given during the winter to the young gardeners training in that establishment has, for the past two years, caused a course of lectures on Meteorology to be delivered in addition to the lectures on Botany, Chemistry, &c., and examinations have been held and certificates awarded for proficiency in this science equally with the others.

The movement to spread the knowledge of the principles of meteorology must be a strictly educational one, for experience proves that it is useless to attempt to popularise it by means of lectures to institutions, &c.; for although offered gratis to committees and managers, these are as a rule very reluctant to accept them, as from the absence of brilliant experiments or optical illustrations, they fail to attract large audiences.

The steps taken by the British Meteorological Society during their last and previous sessions, which have resulted in the addition to its ranks of so many officers of health and civil engineers, show that interest is not wanting in the science; and it is only to be regretted that "Spes" has brought forward his proposal so late in the season, that no opportunity can occur for bringing it before the society before their next winter session.

The want of text books on the science now felt would soon disappear, as publishers would at once bring out works on the subject, were a demand for them to arise.

Richmond

G. M. WHIPPLE

The Axolotl

WHEN, in 1873, Mr. Mivart published in your pages, in his papers on "The Common Frog," an account of the Mexican Axolotl, I arrived theoretically at conclusions which are, I think, identical with those reached by Weissmann, whose researches, recorded in the *Zeitschrift für Zoologie*, you published in abstract on the 8th inst. Mr. Mivart says: "Its mature condition was considered to be established by the discovery that it possesses perfect powers of reproducing its kind;" thus seeming to admit that its metamorphosis from the Siredon to the Amblystoma form proves it to have been really a fertile, persistent, larval form. He then used this metamorphosis of a larval into a mature form as a fact in favour of his hypothesis of sudden development; as if the Axolotl and Amblystoma were actually of distinct genera, and not merely the subjects of a mistake arising from partial knowledge, analogous to those by which the larval Nauplius and Zoëa were constituted into genera. Sir John Lubbock's remarks on Chironomus ("Origin and Metamorphosis of Insects," p. 76) are relevant. He says: "It seems to me possible, if not probable, that some larvae which do not now breed, may, in the course of ages, acquire the power of doing so." Persistent larval forms would seem to have originated from adaptational causes, which, Sir John Lubbock remarks, may act through natural selection; and the power of reproduction to have been in time acquired. Any subsequent cases of perfect development from a previously persistent larval form, such as the metamorphosis in question, would seem, as indicated by the absence of sexual power in the resultant Ambly-

